

**EXECUTIVE SUMMARY OF THE THIRD NATIONAL CONFERENCE
ON SHAKEN BABY SYNDROME**

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PREFACE

The Third National Conference on Shaken Baby Syndrome was held in Salt Lake City, Utah on September 24 through 27, 2000. The First and Second National Conferences had been held in September of 1996 and September of 1998, respectively. The Third National Conference was attended by a total of 636 people representing 48 states in the United States of America, Puerto Rico and four foreign countries. The participants included 39% medical professionals, 10% victims and victims' families, 16% law enforcement or child protective services investigators, 11% social workers, 1% mental health professionals, 13% prosecutors and other attorneys, 4% care and service providers, and 6% prevention specialists. A total of 69 keynote, plenary and workshop presentations were featured in the Conference, with separate tracks for families, medical, legal and investigative, prevention, research, and other participants.

As with the two prior national conferences, the Third National Conference was primarily organized and crafted by the co-conference directors: Jacy Showers, EdD, Director of SBS Prevention Plus and Marilyn Sandberg, SSW, Executive Director of the National Center on Shaken Baby Syndrome in Ogden, Utah. Major supporters of the conference included _____ . The purpose of the conference was to bring together individuals from all

fields and walks of life who work with and are affected by injuries inflicted on infants and young children through shaking. Most of the presenters donated all or part of their time and expenses to attend and present at the conference, and their contribution was vital to the success of the event. The conference was bracketed by a full-day Prevention Institute on Sunday, September 24, 2000 and a full-day Legal Institute on Wednesday, September 27, 2000.

This Executive Summary is intended to synthesize the major points made by the presenters in each of the areas of focus, to identify key issues as to which there is consensus, to issue challenges for further research as to unanswered questions, to reinforce the value of effective prevention programs, and to provide helpful information for victims and the families of victims. The document was prepared and reviewed by an editorial board of experts in several fields. Although this is a summary and thus is not intended or capable of encompassing each and every item discussed or presented at the conference, every effort has been made to accurately reflect the major concepts in each area of focus. The information was gathered from review of audio tapes of 48 of the 69 presentations, personal contact with presenters who were not taped, outlines and information provided by presenters, and the author's attendance at many of the workshops and sessions. The Executive Summary does not necessarily represent the views of the author, the National Center on Shaken Baby Syndrome, or the members of the editorial board, but rather reflects the information presented at the conference.

For ease of reference, the information digested here is presented in the following categories and sub-categories:

I. MEDICAL ISSUES - WHAT DO WE KNOW? - THE EMERGING CONSENSUS

A. Diagnostic Features of the Shaken Baby Syndrome - An Injury Constellation Unique to

Shaking; B. Improving Techniques for Identifying and Documenting SBS Injuries; C. The Critical Role of Ocular Damage in the Shaken Baby Syndrome; D. Excluding Alternative Causes for Medical Findings; E. Is Impact Required for Serious or Fatal Injury? - Biomechanical Issues as to Shaken Baby Injuries

II. RESEARCH AND INCIDENCE - WHAT DO WE KNOW? WHAT DO WE STILL NEED TO LEARN ABOUT THE SHAKEN BABY SYNDROME?

A. New Information as to Victims and Perpetrators of Shaken Baby Syndrome; B. Long-Term Outcome for Survivors of Shaken Baby Syndrome Injuries; C. Common Triggers, Common Stories, Common Excuses

III. INVESTIGATION AND COURTROOM PROOF OF SHAKEN BABY CASES

A. Unique Investigative Challenges in Inflicted Head Injury Cases; B. Proving the Shaken Baby Syndrome in Court; C. Courtroom Persuasion; D. Confronting Untrue Defenses and Irresponsible Medical Experts in Shaken Baby Cases; E. Proving Older Cases By Taking a New Look with New Medical Understanding

IV. THE IMPACT OF SHAKEN BABY SYNDROME ON FAMILIES OF VICTIMS

A. Tragedy Upon Tragedy - What Happens When Professionals are Unaware of Critical Issues?; B. Practical Information for Parents Raising Victims of Shaken Baby Syndrome; C. “Elijah’s Story” - World Premiere of a New Documentary; D. Families are the Best Advocates - Achieving Change Through Legislation; E. The Impact of Shaken Baby Syndrome on Marriages and Families.

V. THE PROMISE OF PREVENTION - KNOWLEDGE IS NOT ENOUGH: FINDING NEW WAYS TO SUPPORT CARETAKERS IN THEIR “MOMENT OF CRISIS”

A. The Impact of Peer Information - The La Vega High School Experience in Texas; B. The

Critical Need for Education of Professionals at all Levels; C. Teaching Parents to Cope with the Challenge of Raising Children; D. Promising Results from Western New York State; E. Identifying and Targeting Those at Risk - The Interface of Research and Prevention

VI. CONCLUSION - CHALLENGES FOR A NEW DECADE AND CENTURY

I. MEDICAL ISSUES - WHAT DO WE KNOW? THE EMERGING CONSENSUS

A. Diagnostic Features of the Shaken Baby Syndrome - An Injury Constellation Unique To Shaking

As in prior conferences, a major focus of this conference was the constellation of injuries which are present in almost every shaken baby case, but which are rarely seen in any other accidental form of trauma. Often referred to as the “triad”, the consensus continues to be that a collection of (1) damage to the brain, evidenced by severe brain swelling and/or diffuse traumatic axonal injury; (2) bleeding under the membranes which cover the brain, usually subdural and/or subarachnoid bleeding; and, (3) bleeding in the layers of the retina, often accompanied by other ocular damage, when seen in young children or infants, is virtually diagnostic of severe, whiplash shaking of the head. Most presenters agreed that in the absence of a major, rollover or side-impact motor vehicle accident, this unique constellation of injuries is not seen in other forms of accidental trauma. It was emphasized that the pattern of injuries caused by shaking and the accompanying rotational forces is different than the pattern of injuries associated with impact trauma to a child’s head and brain.

Drs. Kathleen Dully and David Chadwick challenged us to think in a new way, avoiding the dilemma that occurs in the small number of cases where one or more of the “triad” of medical findings is missing, but where a consideration of all information still points to a diagnosis of shaken baby syndrome. Looking at large populations of victims, these experts pointed out that the truly irreducible component of the syndrome is a change in neurological condition, usually

evidenced by decrease in level of consciousness, breathing difficulties, and/or convulsions or posturing. The second element of this new formulation of the syndrome is subdural or subarachnoid bleeding, although even in the absence of such bleeding brain damage may be evidenced by contusion of the brain or evidence of diffuse, traumatic axonal injury. Third, when the above conditions are seen in the *absence* of a major fall, major motor vehicle accident, or some other comparable event involving a high energy transfer, then shaking is the likely diagnosis.

According to this new view of the syndrome, the presence of evidence of impact of the head is not required for the diagnosis, but many studies of shaken babies have documented the presence of some overt evidence of impact trauma in addition to other injuries. It was noted that the absence of evidence of impact does not rule out the possibility that impact occurred, unless the impact was a massive trauma. Impact to the head usually produces a different type of injury to the brain than shaking. Findings which reinforce the diagnosis of shaken baby syndrome, but which are not essential to the diagnosis, include retinal hemorrhages or other ocular trauma, brain swelling and rapid decompensation, evidence of craniofacial impact, other inflicted injuries such as rib fractures, metaphyseal fractures of the long bones, unexplained spinal injury, inflicted skin injuries, unexplained abdominal trauma. Diagnosis should exclude to the extent possible such conditions as a preexisting coagulopathy, arteriovenous malformation, Glutaric Aciduria - 1, birth injury if the child is less than a month of age, metabolic bone problems, and prior neurosurgery. Absence of any one of the findings may not preclude a diagnosis under this method of considering the syndrome and none of these conditions involves every one of the findings associated with shaken baby syndrome.

Both prospective and retrospective studies were discussed which continue to confirm the significance of the collection of injuries virtually unique to the shaken baby syndrome. In study after study, it is clear that accidental or non-inflicted head trauma in children does not cause the same kinds of severe brain and eye injuries as are common in shaking or other inflicted head trauma. In addition, it was repeatedly established that, on the average, those children who were victims of abusive head trauma have more dire outcomes than children who suffered accidental head trauma. For those children who did survive a shaking or other abusive head injury, long-term morbidity was much more common than in children who sustained accidental head injuries and survived (see Section II, C., below). Additional studies have also shown that the only cause that may be similar to the entire collection of injuries common to shaking is violent, motor vehicle accidents, usually where the child is thrown around inside the vehicle, in side-impact crashes, or where the child is ejected from the vehicle. It was noted that in all of these accidental mechanisms, the injuries to the head and eyes will not mimic the same injuries seen in purely rotational acceleration-deceleration forces as seen in violent shaking. These studies support the conclusion that severe forces are required in inflicted whiplash shaking to result in permanent brain damage or death.

Clear explanations were provided as to the critical difference between translational forces, such as are seen in short falls, which do not produce life-threatening head injuries in children, and rotational, angular forces, which create shearing injuries in the brain. The human brain and skull is built to tolerate and absorb even fairly major impacts which are dissipated quickly. The cranial system is not built to tolerate repetitive, angular acceleration-deceleration forces, which are rarely encountered in any situation other than a severe motor vehicle accident

or a whiplash shaking of the head. The long-held consensus that the more serious the injuries, the more violent the forces which produced the injuries must have been, was reiterated. Another common theme is that children who have life-threatening or fatal head injuries which involve shearing forces to the brain are not asymptomatic for more than a few moments - there is no such thing as a “lucid interval” in such children. It was noted that although a child who has suffered a severe injury may be mistaken to be sleeping, once the serious injury is inflicted, the child would not be able to engage in any normal activities such as eating, playing, interacting or even normal crying.

The shearing forces caused by rotational forces applied to the head of toddlers and infants is thought to be particularly damaging because of the stage of brain development, the extra fluid surrounding a young child’s brain, and the relatively large size and weight of the head compared to the rest of the child’s body. Some research has focused on the reason that woodpeckers can repeatedly bang their heads and beaks against a very hard surface without causing damage to the brain. Presenters explained the difference between biomechanics involved with the action of woodpeckers and whiplash shaking of a human infant’s head. The woodpecker’s neck is hinged in two places and the head moves in a purely linear fashion, saving the head and the brain from trauma. In the infant head, the whiplash force causes the head to rotate in several different angles and this angular rotation is thought to cause the severe damage. Even when the human child’s head moves in a relatively linear motion during violent shaking, the brain inside is composed of material which has different densities, and the brain matter moves in a rotational way during whiplash shaking.

A number of experts questioned whether the “syndrome” should be referred to as “shaken

baby syndrome.” Many prefer a broader designation such as “abusive head trauma” or “inflicted head trauma” or “non-accidental head trauma.” Some feel that the word “shaking” is not descriptive enough to accurately portray the violent and sustained action which produces the constellation of severe injuries; that the word minimizes the true nature of the mechanism of trauma. Others prefer not to designate the mechanism which results in the injury as part of the diagnosis itself, feeling that the injuries are not so clearly caused by only one mechanism that they are pathognomonic of shaking as the sole mechanism. Obviously, the word “shaking” encompasses everything from mild jostling to the worst forms of whiplash trauma and thus lacks definitional specificity. Hopefully, additional discussion through peer-reviewed channels will help to reach some consensus as to what name to attach to this particular collection of injuries in young children. In the meantime, hopefully physicians will feel comfortable at least indicating in their reports and opinions that the classic findings associated with the syndrome show that severe, angular acceleration-deceleration forces were applied to the child’s head. As to that there seems to be little disagreement. In summary, to paraphrase Dr. Betty Spivack: “There’s something very unique and specific about the mechanism of abusive head trauma that separates it from other mechanisms.”

B. Improving Techniques for Identifying and Documenting Shaking Injuries

It is now recognized that children brought for emergent care who apparently have a serious neurological compromise, but for whom the history offered does not explain the severity of the child’s condition or where there is no history offered, should have imaging studies done as well as a complete eye examination performed by an experienced ophthalmologist. Advances in both imaging techniques and in recognition and documentation of ocular injuries were presented

during the conference.

Although CT scans are highly sensitive for detecting bleeding and swelling of the brain, MRI has been proven to be better at detecting intra parenchymal damage, dating blood or fluid collections, and identifying smaller lesions. It was noted that in some cases, ultrasound may be used diagnostically, however this method is inferior in detecting more subtle injuries. There is a need for additional research and controlled study concerning the ability to radiographically recognize diffuse traumatic axonal injury in the brain, especially for those children so severely injured that they don't survive long enough to have evidence of axonal injury at autopsy and for those children who survive the shaking injuries.

The "RetCam", a bedside magnification and photographic tool for identifying and documenting retinal hemorrhages, was demonstrated at the conference. This device has improved the classic standard of ophthalmologic examination and documentation of eye injury, which has involved use of an indirect ophthalmoscope, the necessity to dilate the pupils, and resulted generally in a hand drawing of retinal hemorrhages and other ocular injuries, rather than a digital photograph. The RetCam is a bedside, portable imaging system which allows creating a high-quality digital image of the entire retina in each eye. The RetCam also allows sharing images with experts at remote locations through e-mail capable of transmitting and receiving digital images. A pediatric intensivist demonstrated the value of the RetCam technology, indicating that he has been trained to use the system and document the retinal hemorrhages, which he can then have examined by a pediatric ophthalmologist at a later time for confirmation of the diagnosis. It is hoped that use of this new technology will increase accurate and early diagnosis of cases of shaken baby syndrome as well as avoid missing the diagnosis of head injury

for children brought to care with milder injuries and no accurate history of what happened. Other presenters pointed out that for non-comatose patients, the RetCam can only be used after general anesthesia, which may present a challenge for some physicians.

C. The Critical Role of Ocular Damage in the Shaken Baby Syndrome

Of course, many presenters pointed out what appears to be one of the most significant findings in the shaken baby syndrome: retinal hemorrhages with or without other evidence of ocular damage. As one presenter quipped: “It’s a good idea to take your pediatric ophthalmologist to lunch regularly.” Studies continue to document that retinal hemorrhages are present in between 80 and 100% of cases of shaken baby syndrome.

Dr. Alex Levin, one of the world’s leading researchers and lecturers on traumatic eye injuries in childhood challenged us to recognize that a “retinal hemorrhage” is not just a “retinal hemorrhage.” In fact, the nature, location and number of collections of blood in the layers of the retina can provide a solid, scientific basis for distinguishing between traumatic injury and bleeding which could be caused by something other than inflicted whiplash trauma. Based on extensive research and clinical experience, the consensus of experts seems to be as follows: when retinal hemorrhages are seen in many different layers of the retina, when retinal hemorrhages extend outward from the posterior pole of the eye to the anterior portions of the retina, when retinal hemorrhages are diffuse, indeed when they are presented in any way other than a few dot-type hemorrhages near or clustered around the posterior pole - then angular, rotational forces such as are seen in violent whiplash shaking, are the most likely mechanism of injury. We were reminded that in study after study, retinal hemorrhages of the “traumatic” type identified by the experts are simply not seen in most motor vehicle accidents, in straight falls from even several

stories in height, virtually never in straight falls under ten feet, and are never caused by chest compressions during CPR. If retinal hemorrhages can be caused from those other forms of trauma, they do not have the same appearance as those caused by inflicted trauma.

New computer-generated graphics illustrated for the first time what actually happens during violent, whiplash shaking and how the motion which causes damage to the brain simultaneously causes rupture of blood vessels within the layers of the retina. This assisted those without extensive medical training to grasp the reason that simple falls and mild translational forces do not produce severe injuries to the eyes. The visual graphic illustrations also make clear that the forces involved must be severe in order to result in ocular damage.

It was acknowledged that retinal hemorrhages are not seen in every case where other findings point to severe rotational, acceleration-deceleration forces causing brain damage or bleeding in the brain. As many as 20% of shaken baby cases may not have retinal hemorrhages. In 10-15% of the cases where there are retinal hemorrhages, the bleeding may be limited to one eye (unilateral). It was postulated that the mechanical threshold for bleeding in the brain may be lower than the threshold for bleeding in the eyes, given the fact that almost all shaking cases seem to involve subdural or subarachnoid bleeding over the brain. Conference participants were cautioned, however, that studies which establish that retinal hemorrhages are present in at least 80% of cases of shaken baby syndrome should not be misinterpreted to mean that there are no retinal hemorrhages in 20% of cases - neither math nor logic supports that assumption.

Several presenters mentioned that it is fairly common for emergency room physicians to miss retinal hemorrhages when performing an examination with a direct ophthalmoscope. Since traumatic retinal hemorrhages often extend to the periphery, these peripheral hemorrhages may

not visualized with the narrow focus of a direct ophthalmoscope. In addition, it may take some time after the infliction of a major trauma to the head for the blood to perfuse to the eyes and for retinal bleeding to become visible. Especially when a child has been without effective respiration and circulation for a period of time after the shaking injuries were inflicted, development of retinal hemorrhages may not be clear in the emergency room. As has been stated repeatedly, retinal hemorrhages cannot be “ruled out” in a given case unless an experienced pediatric ophthalmologist has examined the child’s eyes using at least an indirect ophthalmoscope, which enables visualization of all quadrants of the retina. It was also reaffirmed that retinal hemorrhages cannot be used to determine when the injuries were inflicted. There is no standard time within which they will appear after the trauma, and the time it takes for retinal hemorrhages to resolve is also highly variable.

As with other medical issues addressed at the conference, many presenters confronted claims made by certain expert witnesses in courtrooms that retinal hemorrhages and other forms of ocular damage could *possibly* be caused by something other than violent, rotational forces applied to a child’s head. Once again, the focus of these presentations was on the type and location of the ocular damage, and many examples were shown illustrating the difference between retinal hemorrhages caused by disease or natural conditions and those caused by trauma. Several case studies were shared in which the nature of the ocular damage was illustrated, followed by discussion of the confession by the perpetrator which accounted for the damage.

There is an emerging consensus that bleeding in the optic nerve sheath, retinal folds or retinoschisis, and retinal detachment in young children and infants are highly associated with severe rotational forces and are not seen in other causes, once certain diseases or other metabolic

abnormalities are excluded. While retinal hemorrhages of some type can be caused by something other than inflicted traumatic forces, most experts believe that these other ocular injuries cannot be caused without an element of severe, rotational force. And, while it is accurate that some type of retinal hemorrhage may be caused by other disease and metabolic conditions, or from non-inflicted trauma, the type, extent and location of retinal bleeding and/or other ocular damage that is associated with rotational forces is *not* seen from those other causes. As with brain damage, absent a major automobile accident or fall from several stories in height, “traumatic” retinal hemorrhages and other forms of damage to the eye are not consistent with other causes besides violent shaking.

New research has illustrated that children who present with retinoschisis, splitting of the layers of the retina which creates a cavity which partially fills with blood, very often also have dire neurological outcomes. Retinoschisis has not been described in the medical literature as resulting from anything other than violent, rotational forces as in shaking. It was also reaffirmed that those children who survive the shaking rarely suffer vision problems directly associated with retinal hemorrhage or other forms of ocular damage. For those shaking victims who survive with severe visual impairment, the cause is most often damage to the cortex of the brain which interferes with the transmission of neurochemical messages.

D. Excluding Alternative Causes for Medical Findings

A major focus of the 2000 National Conference was confronting alternative “theories” to explain the major medical features of shaken baby syndrome, sometimes offered in courtrooms by irresponsible medical experts called to support the defense against allegations of inflicted injury, and sometimes offered in medical articles, letters, or other communications. The major

medical “defenses” to a claim that a child was injured by shaking were discussed and summarized as: (1) the possibility of an extended “lucid interval” following a serious or fatal head injury; (2) various metabolic disorders which result in bleeding, bone weakness or other problems in infancy; (3) the theory that a preexisting subdural collection of fluid could “re-bleed” either spontaneously or as a result of minor trauma, causing a child to rapidly decompensate and suffer irremediable brain damage or death; (4) various disease conditions which might result in at least one finding commonly associated with a shaking injury; (5) a reaction to a vaccination; (6) claims that a rapid increase in intra cranial pressure (ICP) causes the type of retinal hemorrhages seen in traumatic cases, including ICP from chest compressions or associated with other disease or metabolic conditions; (7) claims that shaking alone does not build enough force to cause damage to the brain and death or serious brain damage *requires* impact; and, (8) claims that short falls of less than five feet can create all the injuries associated with the shaken baby syndrome. Each of these “theories” was explained and debunked. The bottom-line is that none of these alternative theories of causation result in exactly the same clinical or pathologic picture as is seen when babies or toddlers are severely shaken. Many of the articles or studies which allegedly support these alternative theories have been discredited by further research, and many were written about populations of child victims in the era when CT scans were not available, so that the results are immediately of questionable value.

There is a consensus among medical experts that although negative reactions to certain vaccinations can cause irritability in infants and in rare cases other forms of discomfort, no one has ever empirically proven, in a peer-reviewed method, that all of the injuries common in shaken baby cases could be caused by a vaccination reaction. Opinions that vaccination reactions

might mimic shaken baby injuries seem to be limited to those offered by irresponsible medical expert witnesses offering a scientifically unsupportable conclusion as to causation as part of their courtroom testimony. There remains no scientifically valid proof that vaccination reactions include permanent brain damage, retinal bleeding or other ocular damage, or severe and sudden brain swelling. On the other hand, it is clear that children who have been vaccinated often feel some discomfort, which may make them harder to care for and the resulting increase in caretaker stress may contribute to shaking or other forms of child maltreatment.

In every situation where a disease, metabolic condition, or other natural cause might explain some of the bleeding, brain damage or ocular damage to a child, there are several other aspects of the condition which allow skilled experts to differentiate between injuries caused by trauma and injuries consistent with the alternative condition. Most children with one or more of these conditions have fairly clear medical symptoms or features which can be found with imaging, blood chemical testing, or other medical screening. There remains no disease, metabolic or other natural condition which fully mimics every diagnostic feature of the shaken baby syndrome. Minor forms of trauma, such as are present in falls from couches, beds, tables or even down stairs absolutely do not cause the type of injuries common to cases of shaken baby syndrome. In addition, several studies which looked at the effects on children of accidental head injury allow experts to confirm that there is no “lucid interval” following a serious or fatal head injury, with the sole exception being a case where there is solely an epidural hematoma. Since epidural hematomas are associated with impact trauma, not with angular acceleration-deceleration forces, such hematomas are rare in shaking cases. The mechanism which results in epidural hematomas is much different than that which results in subdural bleeding.

Several presenters explained that although a preexisting subdural hemorrhage in the brain of a child *can* “re-bleed” as a result of trivial trauma or even spontaneously, the “re-bleed” usually features only a small amount of blood and is usually asymptomatic clinically. There is no scientific support for the claim that this “re-bleed” is accompanied by severe damage to the child’s brain, eyes, or the rapid decline in central nervous system function which is present in the shaken baby syndrome. It was also pointed out that misdiagnosis of older fluid collections in children’s heads is fairly common, and many of these conditions are actually benign and natural, not the result of older, subdural bleeding. In children with confirmed evidence of a “re-bleed” in exactly the same place as the older trauma, the existence of retinal hemorrhages or other ocular trauma, especially accompanied by severe edema, is *not explained* by the “re-bleed” theory.

The debate as to whether shaken baby injuries can be caused by shaking alone or requires an impact to the head continued, although to a much lesser extent than in prior national conferences. The great majority of experts now believe that shaking alone can and does cause severe and permanent brain damage (see Section I.E., below).

E. Is Impact Required for Serious or Fatal Injury?

Although there are some medical professionals who continue to believe that shaking alone without impact to the head does not generate sufficient force to cause serious brain damage or death to child victims, research performed since the 1987 research study by Dr. Ann-Christine Duhaime and her colleagues has confirmed that impact is *not* required. The 1987 article is based on experiments with biomechanical dolls implanted with accelerometers in the head. The experiments did establish that impact results in 30 times more G-forces being applied to the head than shaking alone, but almost all experts now believe that those studies do not take into account

the difference between impact forces and angular, rotational forces as occur in shaking. The early article also was not able to tell us anything about the cumulative effect on the young human brain of repetitive whiplash shaking. Finally, it was pointed out that Dr. Duhaime's article considered experimental data as to primates and adult humans to determine what G-forces are necessary for subdural bleeding. The consensus that has developed since that time is that G-forces are only one factor to consider and it appears that the primate and adult human model as to brain bleeding thresholds is not scientifically equivalent to the human infant or toddler brain. The biomechanical experiments do, however, make very clear that it is only the most severe forms of shaking trauma that result in permanent brain damage or death.

Since the pioneering work of Dr. Duhaime and others in 1987, there have been a dozen published articles in peer-reviewed journals which establish that shaking alone is sufficient to result in serious injury or death. In addition, presenters pointed to a number of confessions, videotaped demonstrations, and descriptions by perpetrators of fatal shaking which did not involve an element of impact.

The solution to this mild controversy in the medical profession focuses on the difference in biomechanical forces being applied to a child's head during whiplash shaking and those forces seen with a fall or other form of impact. The latter forces are primarily translational in nature, along a single plane, and result in a different set of injuries than rotational forces. For instance, with impact trauma of sufficient magnitude to result in death or serious brain injury, there are usually contusions of the scalp, subgaleal bleeding, possibly skull fracture, epidural hemorrhage, and in rare cases, focal collections of subdural blood. Since many shaken children are also impacted, the combination of rotational and impact forces may result in a combination of one or

more of these findings as well as the classic findings of the shaken baby syndrome. Ocular damage is fairly rare in impact injuries to the head, unless the impact also included the eyes, and then the likely result would be anterior chamber ocular bleeding rather than retinal damage. Inertial injuries to the brain differ from impact injuries in that they feature diffuse subdural hematoma, shearing injuries of the parenchyma, traumatic and diffuse axonal injury, gliding contusions of the brain and, in milder cases, concussion. Most falls, even those where there is some aspect of added velocity, do not involve massive angular, acceleration-deceleration forces being applied to a child's head. The nature, location, extent and result of injuries to a child's head allow experts to distinguish between translational forces and rotational forces. Of course, many abused children have suffered both forms of trauma, and the resulting injuries often document the application of both impact forces and whiplash forces to the child's head. There is no particular set of findings that would allow experts to opine that the only forces applied were from shaking and there was no impact involved at all.

Some presenters explained that it takes less force to cause unconsciousness by inflicted blows than it does to shake the brain apart inside the skull. This is, of course, common sense. Another important factor was repeated by many experts: children are less injurable than adults. Stated another way: children are built to survive most forms of trauma - but not violent, rotational, angular forces applied to their brains. Additional biomechanical research with dolls is ongoing which will shed more light on this issue in the future. In the meantime, even those who continue to feel impact is required for severe injury are among those who believe that there is a consensus - severe injuries require severe forces.

II. RESEARCH AND INCIDENCE - WHAT DO WE KNOW? WHAT DO WE STILL NEED TO LEARN ABOUT THE SHAKEN BABY SYNDROME?

A. New Information as to Perpetrators and Victims of Shaken Baby Syndrome

Several studies of different numbers of shaken baby cases were presented from individual states and relating to a national database being compiled by the National Center on Shaken Baby Syndrome. A North Carolina study considered 101 victims of shaken baby injuries between 1992 and 1997. The conclusion of that study was that race and ethnicity is not a predictive factor for the incidence of shaking injury. However, the other demographic information is also important. In that collection of 101 cases, natural fathers were the perpetrators in 44% of the cases and boyfriends in 20% - males accounted for over 60% of the acts of shaking. In this group, 28% of the children died from the shaking injuries. Two reports were presented from the Maine Statewide Child Death and Serious Injury Panel, each covering 26 cases over two three-year periods. In the first Maine collection of 26 cases, males were the perpetrators in 62% of the cases and 70% of the children died from their injuries. Of the 8 children with inflicted head trauma in that group, the average age was 7 months and 3 of those 8 children died. In the second Maine report of 26 cases, males were the perpetrator in 50% of the cases, and SBS or inflicted head trauma accounted for 5 deaths and 4 serious injuries.

A study of 18 shaken baby cases in the State of Michigan in 1998 revealed that 7 of the children died from their injuries, including one who had been shaken 6 years earlier. In seven of the cases there was a history of prior abuse of the victim. Males and female victims were equally split, however males were the perpetrators in approximately 60% of the cases. Nine of the perpetrators were charged with some crime and four were found guilty. Four perpetrators were

not charged. The Michigan presentation focused on the difficulties in conducting surveys without dealing in advance with confidentiality issues, as one children's hospital who did not report had 21 cases for the period being studied.

Another collection of 34 shaken baby cases from New Jersey was discussed. Subdural hematoma was found in 33 of the 34 children and retinal hemorrhages were found in the same number. In the one case without retinal hemorrhages, the father confessed to shaking the baby. In this sample, 67% of the cases were perpetrated by males and 23% by females. Biological parents accounted for 59% of the cases with male paramours the next highest category at 18%. A total of 68% of the victims had evidence of prior injuries, and almost half had evidence of prior shaking injuries. Two of those children with prior injuries had been admitted to the hospital but had not been diagnosed with inflicted head trauma prior to their discharge. This study looked at stress factors and concluded that 50% of the cases were committed by "experienced parents" - those who had other children in the home, rather than the stereotype of the first-time parents unprepared for the difficulties of caring for an infant. As with many other studies, males predominated and many were either unaccustomed to the care-taking role or were ill prepared for that role. Some of the cases were perpetrated by foster parents, and the recognition that child welfare systems increase stress for foster families is important for future prevention efforts. Many of the children had a prior illness or were sick when they were shaken. It was noted that perpetrators who were themselves abused as children were four times more likely to abuse their own children than those who weren't abuse victims. The stories initially offered by the abusive caretakers featured the all-too-common falls from cribs, beds, infant seats, into playpens; self-inflicted injury; prematurity; and that the perpetrator only shook the baby after finding him/her

not breathing. In several of the cases, there was no explanation provided where clearly the perpetrator knew what happened to the child.

Information gathered from the evolving database of the National Center on Shaken Baby Syndrome was presented. As of September of 2000, that database featured 430 separate victims from all over the United States of America. The source of data ranged from parent reports and media accounts to medical records and prosecutors or investigators. Although not a scientifically verified collection of information, the numbers from this data are consistent with all other surveys, both big and small. In all but 13 of the cases, the gender of the perpetrator was known and males accounted for 63% of the cases, with females accounting for 33%. The highest single category of perpetrator was biological fathers, accounting for 34% of the shaking. Child care providers of all types made up the second largest category and accounted for 24% of the cases. Live-in boyfriends of the child's mother made up 13% and only 6% of the cases were committed by natural mothers. Where the circumstances of the child care arrangement were known, 22 of the cases were committed by licensed home day-care providers, with only 7 committed by unlicensed home providers. Babysitters between 12-18 years old committed 9 of the shaking episodes and relative care givers accounted for only 4 cases. Within this database, 62% of the victims died from their shaking injuries. Only 38% of the victims had other injuries besides the shaken baby injuries, with rib fractures, fractures of other bones and grab marks or external bruises each seen in less than 20% of the cases.

Finally, a collection of information from 128 legal cases involving shaking injuries to young children was presented. These were cases from appellate courts in the United States, which almost automatically means these were some of the worst cases of shaken baby syndrome.

The cases spanned from 1982 to 2000 and came from 32 different states. In this data set, males were the perpetrators in 74.4% of the cases, with biological fathers making up 59.6% of the total of 99 cases where males were identified as the perpetrator. Females made up 24.1% of the total, with biological mothers accounting for 56.3% of the total of 32 cases committed by women. Live-in boyfriends and girlfriends accounted for 27% of the total perpetration, with day care providers making up another 27%. Among victims, 56.3% were male and 43.8% female. The oldest victim reported was age 5 and 86 (67.2%) of the total victims reported were 12 months of age or under. In this group, 63.3% of the victims died from their injuries, with another 21.9% suffering permanent brain damage and/or visual impairment. Only 1.6% of the victims were noted to have made a full recovery after the shaking.

All of the surveys and studies looking at shaken baby syndrome consistently focus on males as being at greatest risk for perpetrating these injuries on children, with biological fathers being the highest single category. This continues to provide focus for prevention efforts, as will be discussed in part V., below. All presenters continued to complain about the inability to capture all cases of shaken baby injuries in any single database, and illustrated the problems associated with creation of such a uniform database. Each state seems to keep track of child abuse in different ways, many identify abusive head trauma but not shaken baby syndrome, and most states have a difficult time even capturing all of the shaking fatalities in their jurisdiction. Challenges to improve record-keeping, methods of diagnostic documentation, and to involve child fatality review teams or committees in identifying all shaken baby cases were repeated.

II. Long-Term Outcome for Survivors of Shaken Baby Syndrome Injuries

A review of the medical literature as well as new studies confirmed that a clear majority

of child victims who survive a shaking injury with severe enough clinical findings to have been brought to medical attention have long-term neurological and/or visual deficits. In most studies, only a small percentage of survivors made a complete recovery after being severely injured. Several studies illustrated that shaken baby survivors have a higher chance for long-term morbidity than children who suffer accidental head trauma. An important addition to our knowledge has been the number of children whose final outcome following a shaking injury is not known for several years after the shaking injury. These children may have learning disabilities or other neurological impairment which is a direct result of the traumatic brain injury suffered in infancy, although they have appeared fairly normal in other aspects of their development. In addition, new studies are showing that children who suffer damage through trauma to their prefrontal cortex may be poorly learn from past mistakes or from the examples of others and thus may continually present behavioral problems which are caused by neurological difficulties.

A new study involving 75 survivors of shaken baby injuries was presented. In that study, which looked at outcome for victims over a several year period of time, it was clear that SBS survivors as a group do not reach developmental milestones as quickly as non-injured children do. In this particular group, day-care providers were the perpetrators in 42% of the cases. A full 50% of the children had evidence of older injuries as well as the final, severe shaking. Of these survivors, 43% continued to suffer some form of seizures, more than half continued to have visual impairment, 42% had sleep difficulties, almost all had motor difficulties, with over 50% of them qualifying as “severely disabled.” Many presenters emphasized the need for more long-term follow-up studies on survivors of shaking injuries, with recommendations being made that

researchers follow children for up to 15 to 20 years after the shaking was committed.

One of the opening keynote presenters for the conference, Elizabeth Phillips, may well represent the hope for many victims of shaking. Although violently shaken when she was an infant, Liz has been an active and effective advocate for children since she was 4 years of age. Although Liz was blinded by the shaking, she has overcome many other difficulties and has been admitted to college since the conference in September.

A study was presented which specifically looked at the effect of delay in seeking medical treatment, or delay in obtaining an accurate diagnosis, following infliction of shaking injuries. A control group of accidentally head injured children was used to compare long-term outcome with shaken baby victims. All of the shaken baby victims had a much longer hospital stay, and had findings that were uncommon in the accidentally injured group, such as subdural hematoma and retinal hemorrhages. The most telling difference was that in the abusive head injury group, the average time between injury and medical care was 1771 minutes, while it was only 100 minutes for the accidentally injured group. A full 85% of the abusive head injury group also had evidence of prior abuse or head injury, with 10 of 17 children having been discharged without a diagnosis of head injury. The conclusion of the study was that delay in seeking medical care for shaken baby victims creates worsened outcomes for those children compared to those children with similarly severe accidental head injuries who are brought for care quicker.

D. Common Triggers, Common Stories, Common Excuses

A theme through all studies and presentations, regardless of the source, is that those who cause shaking injuries in young children have many things in common. First, almost every perpetrator did not choose shaking as a premeditated method for killing a child. Rather, they

were over stressed by a variety of sources while taking care of an infant or toddler. Among the risk factors for shaking must be included multiple simultaneous births in a family, illustrated by a discussion of shaking or other abusive injuries seen in several sets of twins, as well as an analysis of the case in Arizona where each of a set of quadruplets suffered shaking and other child abuse at the hands of their parents. The message for the child welfare system became clear - when one of a set of twins is brought to care with inflicted injuries, the other twin must be medically evaluated. The ultimate trigger that caused shaking, although most prevalently inconsolable crying by an infant or perceived misbehavior by a toddler, may in some cases be totally unrelated to the victim of the shaking. Many cases were detailed in which it appears that generalized stress, or anger at other people was vented on the child victim, who just happened to be in the way when the person lost control and lashed out. Case studies have shown that there are some common stress-related themes in shaken baby cases, including caretakers who are thrust into a new role in caring for a young child, substance abuse, inappropriate expectations of young children or infants, and caretakers who were abused themselves as children.

Those case studies presented at the conference continued to establish that among those who cause shaking injuries in children, the most common “stories” or excuses offered for the injuries are: (1) the child fell from a short distance, including chairs, beds, chairs, tables, high chairs, and down stairs; (2) the child was found not breathing and the caretaker simply shook to revive; (3) either another child caused the injury or the victim did it to him/herself; (4) someone else caused the injury, such as paramedics, police or doctors; (5) the child was injured hours or days before the experts say it happened, and that means others could have committed the abuse; or, (6) the perpetrator has absolutely no idea what happened. These stories are so common

among shaken baby cases, and they have been shown so convincingly to be inadequate to explain severe or fatal head injuries in young children, that they should be given little weight. In addition, as has been said in many legal and investigative journals, when the story evolves or changes when challenged or not accepted, offering such evolved stories should be seen as clear evidence of non-accidental trauma inflicted upon the victim.

III. INVESTIGATION AND COURTROOM PROOF OF SHAKEN BABY SYNDROME CASES

A. Unique Investigative Challenges in Shaken Baby Cases

Investigation of cases involving children injured by violent shaking, as with other forms of severe child abuse, requires different techniques than are used in law enforcement for other types of crime. Investigators must have a good basic understanding of the medical issues involved in abusive head injury to understand when they are being lied to by perpetrators and to effectively confront the perpetrators at the conclusion of an investigation. Another theme common among the presenters at the conference is that the prosecutor should be involved from the beginning of a case, advising the investigators as to legal issues and generally becoming familiar with the facts as they are developed to ease the ultimate decision as to whether to file criminal charges and against whom.

Shaken baby criminal cases are often proven by establishing that the story or history given by the victim's caretaker is false. This is primarily done by illustrating why that story is not a conceivable explanation for the type and severity of the child's injuries. Investigators will only understand why a story is insufficient when they receive training from medical experts as to

the effects on children of various forms of trauma. Several presenters emphasized the necessity that investigators prepare a time line of all important events, which will show when the baby was healthy and when the baby became injured and, more importantly, who was with the baby when the baby was injured.

The investigation of shaken baby cases differs based upon whether the police immediately receive a report of the injuries or whether there is delay between the injury and the notification of the police. In either situation, police must document the “scene” or several scenes which may be relevant to what happened to the victim. In some cases, the child *may* have been hurt in more than one place, such as a babysitter’s home, a day-care, or the child’s own home. This means all of those places should be documented thoroughly, preferably by videotape. Experts recommend that the entire environment be photographed and videotaped. If there has already been a story offered as to how the child was hurt, particular attention must be paid to those areas, objects, floor surfaces, heights, and other measures. If the place has been changed since the child was injured, the persons who changed it should be asked to restore things to the way they were at the time the baby was hurt. In some cases, medical personnel will identify the type of injuries as having been caused by a particular object or method, and police need to try to discover such items or other evidence, using a search warrant if the property owners will not give consent to search.

In most cases, the full extent of the stories offered by caretakers won’t be known early in the investigation, so all aspects of the child’s environment must be fully documented. Relevant evidence to be collected may include the baby’s bottles, blankets, bedding, diapers, items of furniture, toys, bibs, etc. It is important for investigators to document the height of various items

of furniture, and to show the relative distances from cribs, changing tables, beds, couches, and other items to the floor. Similarly, it is important to document the flooring surface, including what lies under the carpet or linoleum, even if actual samples are not removed. To remove samples, a clear consent or a search warrant is usually required. If the documentation of the scene is done in the presence of the caretakers, have the caretaker(s) demonstrate any accidents which occurred, using a doll if a fall was allegedly involved. Videotaping this demonstration will lock them into a story and make it harder to change the story later.

If the allegation is that another child dropped the baby or shook the baby, it is vital that investigators videotape an interview with that child, accomplished with age-appropriate interviewing skills, to determine what the child remembers about the day the baby was hurt and to demonstrate the abilities of the older child to lift and shake an item about the same weight as the baby. If this is not done at the same time as the baby was injured, the abilities of that older child will change and that piece of possibly critical evidence can't be recreated later.

The initial interview with the victim's caretakers is done in a completely non-confrontational manner with the focus being to obtain a detailed account of everything that has happened to the victim for about 48 to 72 hours prior to the injury. The most important time is when the victim went from "fine" to "not fine" and investigators must obtain an account of the onset of symptoms. Experts suggest that officers enlist the help of the baby's caretakers to tell everything that happened so that the doctors will have a better idea how to treat the child in the hospital, possibly being able to save the baby's life or minimize the long-term damage from the injury. When this invitation is made and the abusive caretaker continues to lie about or conceal what really happened, it may help prosecutors prove an intent to cause death or serious injury to

the child through unwillingness to tell the truth about what happened. All people who were with the victim during the time frame must be independently interviewed.

There is consensus among experts that where there are multiple caretakers, such as mother and father, or mother and boyfriend, they *must* be interviewed separately. Joint interviews are virtually worthless to prosecutors in court later because it often can't be determined who said what in response to questions and it also allows the caregivers to hear each other's answers and create a consistent-sounding account. Separate interviews allow comparison and usually the stories will not be exact when one of the caretakers has something to hide. Although different views were expressed during the conference, some investigators recommend conducting polygraph tests for all persons who may have committed the assault against the victim. If such tests are administered by experienced polygraphers who also understand the dynamics of child abuse and something about the medical issues involved, this may help sort out who committed the abuse. Most agreed that this should only be done in conjunction with the final confrontational interview at the end of the investigation. Some cautioned that polygraph results alone should never be used as a basis for either filing charges or refusing to file charges of child abuse.

Collateral witnesses must also be interviewed. These include all persons who responded to the scene, including paramedics, ambulance crew members, life-flight crews, emergency room personnel, hospital social workers, and pediatric intensive care personnel. School teachers, church leaders, daycare providers, other family members, neighbors and friends all may give important information even if they believe they are helping the suspects.

All medical records relating to the victim of the shaking must be collected, and these

records should reflect the entire medical history of the child since birth. Many defenses raised in these cases are based on claims that the injuries could have been caused or contributed to by preexisting medical conditions, but most of those conditions can be ruled out if there were no symptoms seen during health care checks. Records relating to the current injury must be carefully collected and reviewed. Officers should be aware that a general request to a hospital may not yield all records on the particular child, since often radiology records, surgery records, lab reports, and even physicians' notes are kept separately from the baby's "chart". A very specific request is needed to make sure all records are discovered. Investigators should request certified copies of all medical records, charts, imaging studies, reports, memoranda and any and all other documentation relating to the child.

All presenters emphasized the importance of the officer meeting with medical experts and obtaining clear explanations of the nature, cause and timing of the injuries to the victim. Sometimes this means consulting with several medical experts in fields such as pediatrics, radiology, neurosurgery, forensic pathology, and ophthalmology. Officers should understand after these meetings exactly what likely happened to produce the collection of injuries discovered in this particular child victim and should know how much force was involved, what mechanism was involved, how long the assault likely took, and when the assault happened. Officers should question experts concerning the basis of the expert opinions and whether they were able to rule out accidental and/or disease causes of the child's injuries.

After the officer has a very clear understanding of what happened and who likely committed the abuse, confrontational interviews with any remaining suspects should be conducted. This interview should begin with an invitation to restate what happened to the child

and give a full account of the time prior to the injury. As one presenter put it, “give them enough rope and they’ll hang themselves.” After the story or stories are offered, the officer must clearly lay out exactly what the medical experts believe happened to the baby, including when the injuries happened and what degree of violence was involved. Understanding that the perpetrator probably didn’t set out with a plan to kill or maim the child is helpful. The investigator should offer the caretaker several possible explanations, including the fact that they were stressed by caring for the baby and did something they didn’t intend. Visually demonstrating for the suspect why the doctors and officers know what happened with either computer-generated graphics, or charts and diagrams may lead to a confession, when the perpetrator realizes that the justice system will prove their guilty beyond a reasonable doubt in court if the case goes to trial.

B. Proving the Shaken Baby Syndrome in Court

Most presenters focused on the need to use medical experts to educate a group of lay jurors as to complex medical issues in the space of a day or so during a trial. The theme of this conference was that visual demonstrations are required to assist lay jurors to truly understand such complex concepts as “diffuse axonal injury”, “subdural hematoma”, “retinal hemorrhages”, or “retinoschisis.” A number of innovative computer graphic simulations depicting the mechanism that actually results in those and other injuries were unveiled at the conference and are clearly the solution to the age-old problem of simplifying scientific evidence so that jurors can understand. It is vital that prosecutors not only obtain clear explanations of the injuries and the mechanism of the injuries from medical experts, but that the experts be given the chance to visually illustrate what they are saying. This visual illustration also helps to rule out claims by defendants that some other type of force, such as that involved in a simple fall, caused the baby’s

fatal head injury.

Computer-generated graphics can also substitute for post-evisceration autopsy photographs of the victim, which are not admissible in many states in the United States because they are considered too gruesome and unfairly prejudicial to the defendant. If the expert who performed the autopsy can identify the diagram as being an accurate depiction of the type and location of the injury discovered, this may be a non-offensive way to illustrate the expert's testimony. The real advance in computer graphics, however, was shown to be the ability to portray the mechanism that results in a particular type of injury, such as rotational forces inside the head and within the eye which cause the classic findings in a shaken baby case. In addition, examples were shown of computer-generated and animated time lines which visually portray who committed the abuse.

Proof of each case requires prosecutors to establish not only that the baby was injured by the actions of another person, but what mental state that person was acting with at the time. Sorting out who committed the abuse is made much simpler if an investigative time line is constructed showing all the people with the baby prior to the injury, when the baby was hurt, and who was with the baby at that time. In cases where multiple persons are present at the time of injury, their actions and statements after the fact are key. Several presenters indicated the key to proving who committed the abuse is to consider the stories offered and what those stories tell us about the perpetrator's awareness of what really happened and what must be explained away as an accident or a natural occurrence. Cases are proven by attention to detail, and require more effort than most other types of prosecution since they are almost always based on piecing together circumstantial evidence of what happened to the victim and who did it. Experts pointed

out that the general public doesn't want to believe that caretakers hurt their own children or children they are caring for, and thus the burden of proof in these cases is actually higher than other forms of criminal prosecution. Since perpetrators of shaking injuries sometimes have not been engaged in a long pattern of torturing or abusing the victim or other children, they often act and look "normal". The challenge for prosecutors is to get lay jurors to understand that the actions which are required to cause serious injury or death by shaking a child are so severe that anyone who engages in such actions must have been aware of at least a serious risk of injury to the child if not the risk of death.

C. Courtroom Persuasion

Prosecutors were challenged to take their efforts to educate and persuade jurors to a new level by recognizing and using to their advantage the human tragedy involved in every case of shaken baby syndrome. Prosecutor Alex Foster, from the State of Maryland, demonstrated how expert witnesses must translate from one language to another and offered examples for experts to get their points across through analogies easily understood by laypersons. Prosecutors also must spend time thinking of ways to get those points across in a way that is unassailable in closing argument at the conclusion of a trial. During the trial, the prosecutor must take every opportunity to remind the jury that a real human child was the tragic victim in the case, not just a name on a piece of paper or a statistic on a chart. This requires the prosecutor to use videotaped examples of the victim's life or at least photographs of the child prior to the injury as well as visual documentation of what happened to the baby as a result of the injury. In a child homicide prosecution, the focus during closing argument must be on all the life experiences most of us take for granted our children will experience, but which the victim will never have the chance to

do, all because the defendant could not control his temper when the baby cried, defecated, refused to eat, or in some other way was perceived as misbehaving.

The historical practice of charging people who kill children with lesser crimes and sentencing them to lesser sentences than those who commit similar assaults on an adult victim was shown to be ridiculous. Prosecutors must charge cases appropriately, avoiding overcharging, but not undercharging either. The key to better sentences is the prosecutor's advocacy on behalf of the victim at the sentencing hearing. As at trial, the prosecutor must humanize the victim and discuss with the sentencing authority all the opportunities the victim will miss because of the abuse. This approach certainly works for all victims who survive with permanent brain or visual impairment, as it does with victims who die from the abuse.

D. Confronting Untrue Defenses and Irresponsible Medical Experts in Shaken Baby Cases

It was repeatedly acknowledged that irresponsible medical experts are often called to create false causal connections, offer unscientific opinions, or just to create confusion in shaken baby criminal prosecutions. The techniques followed by these experts often involve isolating one medical finding and offering a laundry list of "possible" causes for that finding, without trying to account for all the medical findings together. Some express opinions of causation which are completely contradicted by the great weight of medical literature, yet they do not offer any empirical or other data to support their opinions. Most irresponsible experts do nothing to resolve the issue which they claim is in doubt, but rather continue to foster confusion for the sake of future courtroom opportunities.

One of the newest defenses to shaken baby syndrome is the claim by some experts that

there is no such thing - that children and infants don't suffer serious or fatal injury from shaking. Of course, this ignores the emerging medical consensus concerning the importance of angular, rotational forces applied forcefully to a child's head by whiplash shaking, and it also ignores the hundreds of cases where the experts' diagnosis was borne out by a confession. A case was presented where a prominent defense medical expert testified it was impossible that the perpetrator shook his baby to death and eight months after the perpetrator was sent to prison, he recanted his earlier denials and admitted that he shook the baby and did not impact her head with or on anything. The article documenting "shaken adult syndrome" in a prisoner detained by the Israeli security forces, where the captors admitted all they did to the captive was shake him violently by the shoulders, which caused retinal hemorrhages, severe brain swelling, and subdural bleeding, was used by many presenters as clear evidence that shaking alone can cause severe or fatal head injuries.

The most common history offered by abusive caretakers continues to be that the child fell from a short height, or fell down stairs. This defense can be clearly refuted not only through expert explanation of the medical literature, but biomechanical explanations that the forces involved in a short fall are completely different than those at work during violent shaking. The "re-bleed" defense features an expert who testifies that once a child has a preexisting subdural hematoma, that hematoma can bleed again from minor trauma or even spontaneously. While it is true that this phenomenon does exist, it does not account for a baby who is seen in the emergency room with massive brain swelling, retinal hemorrhages and massive bleeding. Rather, the "re-bleed" would be roughly equivalent to scratching off a scab. Although there would be some new bleeding, that alone would not cause a life-threatening condition. In other words, additional

massive trauma would be required to account for all the other findings. Dr. Mary Case illustrated numerous situations where benign fluid collections were misdiagnosed as evidence of an older subdural collection of blood, but where only fresh blood was seen during the autopsy. She also explained that when children suffer a fresh injury, the blood in the head goes away quickly, it doesn't stay and form a membrane as is the case with chronic subdural blood collections in older adolescents or adults. Chronic subdural membranes form only in people with low intra cranial pressure, such as where there is atrophy of the brain, not in people who have suffered a severe injury leading to increased intra cranial pressure.

Some defendants claim that the baby must have been "fine" for hours after the fatal head injury was inflicted, then the baby just happened to suddenly decline and experience symptoms while they were watching the child. While this claim may have some weight in mild head injury cases, where the baby has suffered a serious injury to the brain which will leave long-term neurological impairment, or death, the so-called "lucid interval" has been shown to be a fiction. Once the baby has suffered the severe or fatal head injury, symptoms would begin virtually immediately and the baby would not be mistaken by anyone to be "normal" or "fine" after that.

DTP and other vaccinations are sometimes blamed for the collection of injuries unique to the shaken baby syndrome. Despite a proliferation of internet websites devoted to the claim that a negative reaction to a vaccination can result in brain damage which could be mistaken for shaken baby syndrome injuries, such claims are completely without scientific foundation. It was pointed out that there is no medical article in the peer-reviewed literature which proves a causal link between vaccines and brain damage, let alone retinal hemorrhages, diffuse axonal injury, subdural hemorrhage or any of the other findings that are seen in the shaken baby syndrome.

Experts illustrated why there is no conceivable mechanism which would link vaccine reaction to shaking injuries. Certain irresponsible experts attempt to confuse juries by claiming that since there seems to be a temporal connection between young infants being vaccinated and the infliction of severe or fatal head injuries, that is proof that it was the vaccination which caused the injuries. It doesn't take much common sense to realize that children who have been vaccinated may be uncomfortable as a result and that this presents a stressful situation for care givers. Although many babies are shaken within the time they are still experiencing symptoms from the vaccination, that does not equal scientific proof that it was the vaccination that caused the injuries.

Another common theme of irresponsible defense experts is the claim that the baby may have had a clotting disorder, referred to by experts as a "coagulopathy", and that is what caused the retinal and intra cranial bleeding, not shaking. While it is true that rarely children are born with such a disorder, there are no such disorders that occur, then go away with no apparent symptoms. Dr. Carole Jenny as well as other medical experts offered a complete explanation of each of these disorders and explained that children affected with such medical problems generally have a myriad of other problems which won't be missed by caretakers and physicians. She also pointed out how rare most of the disorders are in the general population. Many of the disorders are benign conditions, which the irresponsible experts try to convert into a sinister, lurking cause of fatal or debilitating brain injury. While it is true that most children who suffer a serious head injury often have clotting problems *as a result* of the traumatic damage to their neurologic system, that should not be confused for evidence that such findings preexisted the trauma.

New favorites of the irresponsible experts are “arteriovenous malformation” and “superior sagittal sinus thrombosis.” Although these are extremely rare conditions, some experts seem to be “finding” these conditions to explain subdural bleeding which in fact was the result of severe trauma. Again, Dr. Case illustrated that if these conditions exist, they have a very unique appearance and should not be mistaken for traumatic injury. Neither condition has ever been associated with retinal hemorrhages or other ocular damage and there has been no attempt by the irresponsible experts to demonstrate empirically such a connection.

Prosecutor Brian Holmgren offered a blueprint for cross-examining the irresponsible and often unqualified expert. The first step in his plan is to force the defense to identify the expert and provide the prosecution with a report as to what the expert will say in the case. This must be done through discovery and with enough time before the trial or hearing to research the background, writings and former testimony of the defense witness. The next step involves consulting with other medical experts about the reputation of the defense expert, the weaknesses of his/her theories, and whether the defense expert is even qualified to offer opinions in court. Several of the commonly seen defense expert witnesses actually have several deficiencies in their background, training, research or experience which if discovered before trial may support a motion to block their testimony. Even if such motions are unsuccessful, information gathered about the witness’ lack of qualifications is a potent tool for cross-examination and neutralizing the expert’s opinion. Prosecutors should obtain transcripts from cases where the expert has testified before, preferably in similar child abuse settings, and should talk with attorneys who have faced the expert before.

If the expert is ethical, he or she will insist on being provided with all information on the

case, not just with selected pieces which might support the defense theories. Prosecutors should attempt to meet with the defense expert to discuss the case prior to trial. Again, the expert who has nothing to hide and who is a neutral scientist should have no objection to such a meeting. Effective methods for cross-examining an irresponsible medical expert include: (1) showing the lack of experience or qualifications in the field; (2) establishing inconsistency of the expert's opinion with the great weight of the medical literature; (3) illustrating inconsistencies between the expert's opinion in court and his/her prior written articles or books - or showing internal inconsistency in the courtroom testimony; (4) showing that the expert has not reviewed all the evidence in the case, but was only provided a selective sample helpful to the defendant; (5) exploiting the lack of research conducted by the expert to prove his/her opinion is correct and the weight of medical literature is incorrect; (6) gaining an admission that the expert continues to testify to the opinion offered despite vehement criticism from colleagues; (7) showing the outrageous fees paid to the expert, to establish the motive for testifying in a way that justifies those fees; (8) obtain concessions as to issues where the expert agrees with the prosecution's experts; (9) remind the expert that the oath they took involved telling the "whole" truth, not just part of the truth, thereby creating confusion where there is no confusion; and, (10) show that the expert always testifies for one side, but never for the other.

Unique causal theories should be challenged by showing through the defense expert the lack of peer-reviewed articles in the medical literature to support the unique theory, compared with the myriad of articles claiming the opposite position. Prosecutors should get the expert to admit that his/her opinion is a "minority view" or maybe even a unique view. Such an opinion won't be accepted by a jury unless it is very clearly explained and proven. Illustrate the

speculative nature of many irresponsible opinions. Such opinions are often based on the lack of findings rather than anything affirmatively showing the existence of the alternative cause of the injuries. The primary focus of cross-examination, though, should be to force the expert to consider all of the victim's injuries as a constellation of findings, not isolate one or more and try to explain them away individually. An expert who seems to have a plausible alternative explanation for bleeding in the brain may have no idea how to explain retinal hemorrhages which are bilateral and extend into the periphery of both eyes. Those who claim that all retinal hemorrhages are identical and all may be caused by increased intra cranial pressure are simply misinformed, based upon the current research (detailed in Part I, above). Prosecutors must remind the jury that possibilities offered to account for one of the injuries do not equate to a reasonable explanation as to how all the injuries could have been caused. As one presenter stated: "This is a forest, not just a collection of unrelated trees." Pure speculation is not an appropriate basis for expert opinion in the courtroom.

Prosecutors were encouraged by an example of a 21-year-old case which was initially ruled an accident, but which with the benefit of modern medical knowledge was clearly a shaken baby case. The case was reinvestigated, reevaluated by medical experts, and successfully prosecuted against the babysitter who had killed the baby in 1978. Similar cases are likely to be discovered as other medical experts view old cases with the benefit of new research and understanding. No child should suffer or die without justice, when the true cause of their injuries was inflicted head injury.

IV. THE IMPACT OF SHAKEN BABY SYNDROME ON FAMILIES OF VICTIMS

A. Tragedy Upon Tragedy - What Happens When Professionals are Unaware of Critical Issues?

Despite the increase in available training for everyone who plays a role in shaken baby cases, the unfortunate reality is that many professionals are inadequately trained and that lack of understanding can result in compounding the tragedy for parents whose children are injured by someone else. New stories were related of parents who were initially suspected of having caused their baby's injuries when it was clear from the undisputed evidence that a day-care provider, babysitter or someone else was actually the perpetrator of the abuse. The pain that these families felt having other children removed and not being able to visit the victim of the shaking should serve as a wake-up call that all investigators, child protection workers and attorneys, medical professionals, and prosecutors must learn more about the shaken baby syndrome to enable correct diagnoses and accurate determinations of who committed the abuse early in an investigation.

For every victim of shaking, whether they survive or not, there is a tragic story of everlasting pain for everyone involved. Families are often split apart, perpetrators imprisoned for long terms, mothers left to care for other children and sometimes a child who is severely handicapped only because of the selfish and unforgivable actions of a caretaker who was not up to the task of being alone with a child. These non-offending parents will forever ask themselves "why?" Why didn't they see the warning signs? Why did they leave the baby with the perpetrator? Why did the perpetrator seem to fail to understand the damage that could be done by violent shaking of the baby?

Professionals at all levels must maximize their knowledge of abusive head trauma in order to avoid re-victimizing these parents through improper decisions as to who committed the abuse, by removing children during the investigation when it is clear the parents could not have caused the abusive injuries, and by delaying an accurate diagnosis through lack of awareness or unwillingness to take a strong stand as to the medical issues. Once again, parents of victims taught us all that our duty doesn't end with the victimized child. Once again, parents taught us that there is a pressing need for specially trained investigators to handle these cases for child protective services and for law enforcement, and for only those prosecutors who understand the issues to handle child protection cases or criminal prosecutions. Although most investigation and prosecution offices around the country now employ special victim-witness assistants, these professionals are not often used in cases where a child is seriously injured or killed by abuse. All professionals need to become more sensitive to the feelings and emotions of parents who were not involved in their own child's abuse.

The perspective of Dr. Debbie Eappen helped us all understand how the media and the criminal justice process often contribute to the revictimization of innocent parents of a shaken baby. The Eappens were vilified in the media and Matthew was hardly recognized as the victim of massive inflicted trauma, both because the media sold out to those who refused to believe that Louise Woodward was the "type" of person who could commit such a violent act against a baby, and because the Au Pair agency which employed Woodward spent millions of dollars on her defense. The fact that the media would cater to the orchestrated attempt by the Woodward "dream team" to blame the Eappens for Matthew's injuries tells us that we all have a role to play in educating media representatives about the shaken baby syndrome. Matthew Eappen was

clearly violently shaken and abused by Woodward during the day that he was hospitalized. The cadre of highly-paid and irresponsible medical experts who testified on behalf of the defense misrepresented the nature and location of Matthew's injuries in order to weave an apparently plausible set of theories, yet the jury rejected the attempt and only the trial judge was misled. Although this high-profile case solidified the industry for irresponsible medical experts, the conference went a long way toward dismantling that industry by revealing the sham upon which it is based.

B. Practical Information for Parents Raising Victims of Shaken Baby Syndrome

One of the most important messages to parents who feel guilty about "allowing" their baby to be shaken was repeated by presenters from all professional fields. There is no profile of a person capable of committing this violent assault against a child. Virtually everyone who has ever provided care for an infant or young toddler has been frustrated and stressed, and most have felt that they were on the verge of losing control. Fortunately, almost everyone is able to avoid harming the child in that "moment of crisis." Although there are many common triggers in retrospective review of cases of shaking injury, those triggers are commonly seen in almost everyone's life. Many babies and toddlers are shaken by people who have hurt children before, but an appreciable number of cases of shaking represent the first time the caretaker lost control to the point of causing serious injury. For those non-abusing parents who feel guilt for not having "seen it coming", the message was clear: very rarely can people identify the risk that violent assault on a baby or toddler will occur.

Parents of surviving victims were given excellent guidance for ensuring that educators understand the physiologic challenges faced by children with traumatic brain injuries. If school

systems are not providing the education that teachers, counselors, and administrators need, then parents should provide that education themselves. Educators must understand the physiologic consequences of a traumatic brain injury, including not just the obvious physical and developmental differences but maybe more importantly the effect on behavior of the injured child. Since many effects of the shaking injury may not even be discovered until children are school-aged, it is important that educators understand the basics concerning traumatic brain injury so that they can be sensitive to the victim's needs and also put themselves in a position to recognize learning difficulties.

Because the frontal lobes of the brain are most often injured in severe shaking episodes, it must be understood that part of the brain involves "executive" functions, such as inhibitions, self-discipline, decision making, and planning. Children who survive with damage to this part of the brain may actually be impaired in their ability to process memories, compare prior negative experiences, and avoid acting in a similar way. In other words, self-control and appropriate behavior may be hampered by physiologic damage to the brain. This is the reason that traditional methods of discipline may be completely useless with a child who has a brain injury. These children are often unable to call up a memory for a past event where discipline was imposed in order to use it to decide what their behavior should be in a current event. In cases where there is diffuse brain damage and brain swelling when the victim was an infant, many different areas of the brain may be compromised, resulting in a variety of challenges which may not become apparent for many years after the crime was committed.

Parents were encouraged to avoid negative fights with educators, but rather to take a positive approach by providing clear and comprehensive information to those who come in

contact with their child. In effect, parents must provide information and training, encourage the educator to seek out additional information, and provide some alternatives to traditional techniques for learning and discipline so that the educator can act appropriately with the victim of a shaking injury.

Parents of surviving victims were also given guidelines for tapping into the system of service and support delivery in the United States. Because there are no clear statistics concerning the number of children who suffer traumatic brain injuries, there has not been a coordinated public service plan for victims of shaking. It was estimated that there are 5.3 million people who are living with a traumatic brain injury. Although care is generally good during the “acute care” phase following the child’s injury, once the child is discharged from the hospital, the provision of services is often not as well organized and not as clearly accessible to victims and their caretakers. At the conclusion of the acute care stage, families need information so that they can learn what resources are available for long-term care and how they can navigate that system.

Where the system of service delivery seems to ignore victims of brain injury, parents of survivors should aggressively pursue, and even take the lead, in developing a plan for public health systems to deliver needed services. If this takes education of policy-makers or legislators, parents should realize that their “real-life” stories of frustration and compromise will be very persuasive to policy makers. When parents in similar situations join together, their collective voice is even harder to ignore. Family associations should push for better public funding for physical therapy, educational opportunities appropriate to their child’s needs, occupational and recreational therapy, and additional research intended to make life better for surviving victims.

Parents were given information concerning long-term care options for survivors and

respite care for families. The costs of providing full-time care in an institutional setting can be staggering for survivors as they grown into adulthood, but with the need for 24-hour assistance and care. Intermediate care facilities are an option for many families to meet the needs of their children at a reduced cost and with public assistance provided. Although it is emotionally difficult for parents to place a child in long-term intensive care facilities, examples were given as to when that may be an appropriate choice.

Parents were also provided new information from a study of 101 children who survived an inflicted brain injury, 32 of whom suffered feeding or swallowing problems. Of this group, over half of the children required feeding by a G-tube, but 93% were determined to be at risk for aspiration caused by the neurological effects of the injury.

C. “Elijah’s Story” - World Premiere of a New Documentary

Most conference participants attended an evening showing of a new documentary produced by award-winning film maker Donna Dewey in conjunction with the National Center on Shaken Baby Syndrome. The film dramatically portrayed the ripple effect which occurs in families when an infant is shaken to death by a family member. Elijah Fisher was shaken in December of 1998, and died on Christmas Eve of that year, he was only 16 months old. The perpetrator was his natural father, Jason Whittier, who later admitted shaking, punching and slamming Elijah because the baby would not stop crying. Everyone seemed to agree that Jason had been a loving father to Elijah and was “not the type” of person who could commit such a violent assault upon a helpless infant.

The real strength of the movie, however, was its depiction of the tragic loss for Elijah’s mother, Emily, and her struggle to understand how something like this could happen and how she

would cope with the loss of her only son. The ripple effect of the tragedy as it impacted the lives of both Jason's and Emily's extended families illustrated well how a moment's loss of control by one person can change the lives of many. It is hoped that Jason's interview from prison, in which he tearfully recounts what happened and how his actions justify his punishment will be an image which future caretakers might think of in their own "moment of crisis", leading them to put the baby down before inflicting harm. "Elijah's Story" is now being used in shaken baby and child abuse prevention efforts all over the world.

D. Families are the Best Advocates - Achieving Change Through Legislation

Many family members of victims of abusive head injuries become extremely committed and effective advocates for change. Not only do they remind us of the constant need to keep up with changes in our field or profession, but they encourage us to work harder to prevent further tragedies in the future. Dr. Kathy Dittman and her husband Mark have frequently touched those who attended the conference with their tireless pursuit of change after their daughter, Maggie, was killed by her babysitter in Texas. In conjunction with the Shaken Baby Alliance, a powerful and effective group of family members and others touched by shaken baby syndrome, the Dittmans were able to achieve passage of several pieces of legislation in their native Texas which will make prosecution of perpetrators easier and will recognize those who kill children as violent felons who should not be released pending their appeals.

Other examples of both effective prevention efforts engaged in by families of victims and of legislative, policy and procedure changes were discussed during the conference. Advocacy groups are truly having a huge impact on the system by banding together and using their collective awareness, knowledge, and passion. Their advocacy is resulting in media campaigns

to educate the public about the shaken baby syndrome, direct efforts to educate others, training of criminal justice and child protection professionals to understand the problems of inflicted brain injury and handle cases better, reforms of the court process to better accommodate the interests of families of victims, and encouragement of the medical profession to make sure that those who are making diagnostic and treatment decisions for victims have the best training and resources at their disposal.

E. The Impact of Shaken Baby Syndrome on Marriages and Families

Several courageous parents gave us a glimpse inside the most private aspects of their lives following the abuse of their children, revealing for the first time the challenges of keeping a marriage together while caring for a traumatized child. Although each parent or set of parents who spoke at the conference reacted a little differently than others, the theme common to all was that the traumatic injury to their child changed each of their lives, which in turn changed who they were. As one parent so eloquently put it: “My husband was no longer the person I married - and I wasn’t the person he married.” All agreed that their lives were permanently changed by the selfish and uncaring act of someone with whom they had trusted their child’s care. Everyone agreed that there is no returning to “normal” after that.

These unique challenges to marriage were the same whether the victim of the child abuse died or survived with permanent brain and other damage. Tensions were often enhanced when one or both parents attached blame, including in some cases, blaming each other for what happened to their child. Although some marriages were terminated, some had weathered the onslaught of difficulties. However, the message was delivered very clearly: those difficulties and challenges never end. Families of shaken baby victims never “get over” the trauma and its

effects.

Some parents disclosed forcing their spouse away by focusing all their attention on caring for the injured child. Others shared their feelings and realized that their own personal reaction to the trauma was different than that of their partner. It was emphasized that all people who endure a severely traumatic experience have tremendous mental challenges, but when the tragic circumstance is either permanent loss of a child or impairment of that child to the extent that they will never undertake activities that other children and parents take for granted, the parents are already low on emotional resources when they need them most to support and assist each other.

The fathers who presented unanimously expressed guilt for not having protected their children from harm. Each acknowledged that logically they couldn't have seen the abuse coming, but nevertheless reminded us that emotionally they will always have those feelings. The fathers acknowledged feeling differently than their spouse about how to cope with the trauma, and even contemplated whether it was better for the victim to pass away or to continue to survive in an unresponsive state. The most important message shared was the advice to find the strength to adjust to the new life that child abuse creates, convert energies into prevention and education efforts, and jointly do what is necessary for the victims of shaken baby syndrome.

**V. THE PROMISE OF PREVENTION - KNOWLEDGE IS NOT ENOUGH:
FINDING NEW WAYS TO SUPPORT CARETAKERS IN THEIR
“MOMENT OF CRISIS”**

In contrast to prevention issues discussed at the First and Second National Conferences on Shaken Baby Syndrome, the theme of this third conference was a recognition that although

most people now seem to recognize that it is dangerous to shake a baby, many people still do so in a moment of rage and frustration. Innovative prevention programs have sought to move to a new level by combining provision of information with strategies for coping with the frustration and stress of caring for a difficult child. The consensus seems to be that unless communities find ways to provide relief and support for young parents or inexperienced caretakers, severe abuse of children will continue.

A. The Impact of Peer Information - The La Vega High School Experience in Texas

What are the odds that two football players for the same high school football team in Waco, Texas would have suffered the effects of shaken baby syndrome in their families? What are the odds that the two of them would become good enough friends to share this information with each other? The rest of this story has been profiled on national television as a model child abuse prevention effort. Adam Fetsch, whose nephew Trae Smith suffered permanent brain and vision damage at the age of three months when violently assaulted by his babysitter, and Roman Cisneros, whose cousin Jordan died as a result of violent shaking, decided to do something to prevent other families from having to suffer through this same type of tragedy. Roman and Adam decided that they wanted to ensure that no one they came in contact with could ever say they were unaware of the dangers of shaking a baby. They recognized quickly that this form of child abuse is preventable and applied their creativity to finding ways to get the message across.

In their senior year, Roman and Adam enlisted the help of their entire football team and soon the effort spread to the entire school. The team dedicated its entire season to the memory of Roman's cousin Jordan and the recognition of Trae Smith's injury, and lost only one game all year. The "cause" brought the team together united in a common effort. During each halftime

show, the La Vega Pirates presented information about shaken baby syndrome. The team wore hot pink shirts each Friday before a game printed with a shaken baby prevention slogan. Despite initial resistance, school officials permitted a full-school assembly which gave Adam and Roman the chance to educate the entire school about shaken baby syndrome. Supporters passed out jugs filled with macaroni with the slogan “Shake Jugs, Not Babies” emblazoned on them. Their efforts were featured on closed-circuit high school television news programs, and on national news programs.

Their efforts touched Laura Lenart, a student at Connally High School, a sports rival of La Vega High School. Laura took the prevention message to her entire school, conducting assemblies and other education and prevention efforts. Laura created a videotape which emotionally and cognitively delivered the message. As Adam concluded: “We know that everyone who heard our message will tell lots of other people, and we know that those people will never shake their babies.”

B. The Critical Need for Education of Professionals at all Levels

Several presenters recognized that a major aspect of prevention is education of front-line medical professionals to recognize the signs and symptoms of inflicted head injury in infants and children to avoid the misdiagnoses which have been documented. Case after case was reviewed in which a baby was killed or permanently injured by abuse where physicians missed early signs of abusive head trauma and decided that the baby was suffering from other conditions. Parents of shaken babies in Wisconsin realized that education of these medical professionals to be sensitive to the possibility of inflicted head trauma might lead to at least some of the serious injuries being prevented by early recognition of the pattern of abuse. These parents put together

almost 3,500 boxes with information, posters and an educational videotape relating to shaken baby syndrome. They continued their effort by presenting in-service training for nurses and physicians.

Justice Mark Kennedy of the Alabama Supreme Court offered suggestions on how to educate judges, the most important link in the justice and child protection systems. Although judges are very careful to remain impartial, the education they receive through the adversaries in individual cases is generally insufficient to prepare them to make appropriate decisions in these cases. Other ways to reach judges include tapping into judicial colleges, both state and national; using judges to train other judges; provide judges with general information about abusive head trauma in children but not associated with any particular case before the judge; and taking advantage of the chance to present victim-impact statements to a judge in an individual case. Just as with investigators, prosecutors or other professionals, judges need some basic training to make the most informed decisions. Impartiality should not be equated with being uninformed. Judicial training agencies should be convinced that judges can't make correct decisions without scientifically accurate information to support those decisions.

Finally, it was made clear that child protective service workers and law enforcement investigators need to be better trained in the substantive medical and behavioral issues associated with shaken baby syndrome. Lack of such awareness has resulted not only in removing children from homes where that action was irresponsible, but in leaving other children in dangerous situations where they were repeatedly abused until a fatal or permanent injury was inflicted. Neither scenario is excusable, given the state of knowledge of medical issues such as onset of symptoms and violence of the attack, as well as understanding of the behavior of perpetrators.

Caretakers who are never identified and brought to justice for harming a child through abuse remain dangerous to other children in their care, absent a full admission of their conduct and intensive efforts to change the behavioral problems which caused the attack in the first place.

C. Teaching Parents to Cope with the Challenge of Raising Children

Those involved in preventing child abuse have recognized that most impulsive acts are caused by inability to deal with stress. Often perpetrators are young, unprepared for nurturing a child, have inappropriate expectations of a child, or are faced with unusually difficult children. Research has identified a number of risk factors, many of which relate to children with physiologic or behavioral problems that make them harder to care for than other children. A major aspect of providing necessary support for parents is to identify the problems that might cause their child to be a “difficult” child. This focuses on the need for further education of pediatricians, family practitioners and physicians in family health clinics to understand how to diagnose and treat various medical causes of discomfort for infants and young children.

The other major change in prevention programs involves teaching parents what to do when confronted with an apparently inconsolable infant, how to handle toddlers during temper tantrums, and most importantly, how to walk away rather than lose emotional control and harm the child in a moment of anger, rage or frustration. Research has shown that babies may continue to cry even when apparently all of their needs have been met, especially between two and four months of age. Caretakers need to be trained that it’s okay to leave a baby in a safe place while they cry - much better than continuing to try to stop the crying, losing control and hurting the baby. Although some babies suffer shaking injuries in conjunction with a pattern of other inflicted abuse, a significant number are harmed only by the final act of shaking by a frustrated

and angry caretaker. The latter group of cases is most preventable.

Another theme of modern prevention programs is putting caretakers in touch with resources which might provide support or respite care for children and their caretakers. Too often, babies are shaken by young parents who are socially isolated, have little family support within a close proximity, or who are unaware of community resources to provide such support. Given the prominent role that stress plays in shaken baby cases, all child advocates should support public and private efforts to create more such support agencies and to make sure that all who provide care for children know how and when to ask for that help. Caretakers need to be empowered to seek help, being told that there is nothing wrong with acknowledging the need for a “break”, and that asking for help does not mean they have failed in their caretaking role.

D. Promising Results from Western New York

Dr. Mark Dias presented the details of his hospital-based prevention program in both the Prevention Institute and during the conference. Dr. Dias, a pediatric neurosurgeon from Buffalo, New York, implemented a program whereby all new parents are provided with education concerning the dangers of shaking a baby. Dr. Dias recognized through surveying this group and by looking at perpetrators of prior shaking cases that they knew that it was dangerous to shake a baby, and he reasoned that it takes something more to actually prevent more incidents of violent assault on children and infants. Based on this, his program added an affidavit that parents voluntarily sign before leaving the hospital with their baby. In the affidavit, parents acknowledge receiving the training on the dangers of shaking a baby and provide a commitment to pass that information along to all those who care for their child in the future. In their children’s hospital, 8 cases of shaken baby syndrome were seen in the 12 months preceding implementation of the

program, but only 2 were seen after the program began in the ensuing 22 months - an 82% reduction. Another Children's Hospital in an adjacent section of the State of New York saw an increase in cases during the same period of time. This program or a variation of it is now being adapted to several other states, with the hope that the commitment to never shake a baby, added to the cognitive awareness of the dangers of infant shaking, will trigger a memory in the moments when parents feel they are pushed to the edge.

E. Identifying and Targeting Those at Risk - The Interface of Research and Prevention

A number of different prevention programs from different states in the United States were discussed and although there were many similarities among the programs, each added something new to the approach. All used existing research as to incidence of shaken baby syndrome to target males and day-care providers, as well as young, isolated parents for education efforts. Most new programs focus not on the effects of the shaken baby syndrome as much as on positive advice and suggestions for caretakers as to what to do when a baby won't stop crying. The focus is on conveying a message that will come into the consciousness of those who are at the brink of losing control and hurting a child, and which will stop them before they harm the baby. Many efforts are underway to reeducate parents about how to raise children, dispelling myths and "wives tales" such as male babies need to learn not to cry and to "be a man" and that parents can "spoil" a baby with too much attention or care. Almost all prevention programs feature a focus on males as parents. Many are targeting middle school or high school students with both a warning as to the dangers of abusing children and positive suggestions for dealing with crying children. There is a recognition that men who "acquire" a family through adoption, foster care, or simply through a new relationship with a woman who already has children need support and

training, as well. The United States is finally emerging from the centuries-old myth that we don't need to provide training to caretakers, they will "just know" how to parent.

All prevention professionals agree that it is not wise to provide misinformation to the public, and most have abandoned the practice of a decade ago when prevention posters and training materials claimed that "even gentle shaking or jostling can cause fatal or permanent brain damage." Without suggesting that it is safe to throw babies up in the air and catch them, or to bounce them on the knee with the head unrestrained, trainers are acknowledging that it takes an extremely violent assault to produce life-threatening injuries.

VI. CONCLUSION - CHALLENGES FOR A NEW DECADE AND CENTURY

From all that has been learned about the shaken baby syndrome, one thing stands out: this is a particularly preventable form of child abuse which has tragic consequences for the victims, their families, and even the person who perpetrates the crime. Despite the proliferation of information and the apparent increases in the number of people in the general population who have some general awareness that it is dangerous to shake an infant or toddler, the numbers of cases appear to be increasing. Thus, our challenge for the future is to target new prevention efforts to those at highest risk to commit this severely violent form of child abuse. In addition to providing information on the dangers of shaking children, we must provide positive parenting training to everyone who will or may be tasked with the role of caring for young children. Although we will probably never eradicate this form of child abuse, we can have a significant impact in reducing the incidence. For every case we prevent, we can take solace that one more family was spared the never-ending pain caused by inflicted whiplash shaking of children. We

won't know their identity, they won't know how close they were to becoming embroiled in the tragedy, but the would-be perpetrator who decided to do something other than shake a baby in their moment of extreme stress will know.

Research and continuing experience tells us clearly that the pattern of injuries commonly seen in shaken babies is rarely seen with any other cause. In fact, this collection of injuries is one of the few that is virtually diagnostic of the cause. Although further biomechanical studies, studies using animal models, and other forms of research will solidify our understanding, it is not likely that research or experience will show that we are wrong about the significance of the collection of head and eye injuries associated with violent, rotational forces being applied to the head. This is not a scientific premise which can be equated with the once-prevalent notion that the world is flat, despite arguments from a small minority of critics.

Further research will likely confirm that the forces involved in impact forces are different than the angular acceleration-deceleration forces imposed on the child's head during whiplash shaking. This should end, once and for all, the controversy as to whether impact is required to cause permanent brain damage or death in children. Research is also needed to identify better and quicker methods to stop the secondary injury suffered by victims of severe shaking, to maximize their ability to survive the injury and minimize the long-term brain damage resulting from the abuse. Although we can't stop the delays in seeking medical care common in child abuse cases, nor can we stop abusers from lying about what happened to the child, we can make sure that physicians and other medical professionals are well trained to consider shaken baby syndrome in the differential diagnosis when a child presents with "mysterious" symptoms or repeatedly is presented for care where medical intervention seems to be ineffective. Such

training should, within a few years begin to pay off if more cases of milder inflicted head trauma are caught early enough to avoid repeated chances to abuse the child.

We must encourage training and cross-training of all professionals who play a role in shaken baby cases, from medical professionals on the “front-lines” to EMT’s, from child protection workers and law enforcement investigators to attorneys involved in both child protection and criminal prosecution, as well as judges who decide cases. Each person at each level of intervention in both the care systems and the justice and child protection systems must be specially trained to handle these cases in order to avoid mistakes that result in even greater tragedies. In addition, more resources should be devoted to providing appropriate care and opportunity for victims of shaking who survive and their families, especially focusing on the period of time after hospital-based care ends.

We must recognize that those who violently shake infants and toddlers know that what they are doing is dangerous to the child, and are aware of a high risk of serious injury or death to the child. This action, even if it begins as a loss of control, takes long enough and is violent enough that anyone who is not mentally incapacitated has time to realize what they are doing and stop. Even if the perpetrators appear to have been “wonderful parents” or “not the kind of person who would do such a violent thing”, we must recognize from our experience that there is no profile of a person who can shake a baby. If there were such a profile, it would be broad enough to include anyone and everyone who can be stressed by the care of a child, and who is capable of being pushed to the brink of control. We all need to get this message across to the public media, so they stop the sensationalized reporting that characterized the Louise Woodward and other “high-profile” cases, and encourage reporters to learn the science behind the shaken baby

syndrome so their reports are accurate rather than visceral.

Those who cause shaken baby injuries must be punished in the criminal justice system, and must be recognized as presenting a danger to other children until they admit what they have done and seek behavioral change to keep those circumstances from happening again. These goals can only be accomplished if we move investigators and prosecutors to a higher level of understanding of the medical and proof issues involved in these cases. All prosecutors in the country should have access to new computer-generated graphics to assist them in presenting complex medical expert testimony to groups of jurors made up of common people from the community.

Our ten-year plan should be to reduce the numbers of shaken baby cases by at least half, to take steps to make sure that every professional who comes in contact with such a case is competent to accurately and confidently do their job, to provide positive parenting skills to everyone and coping skills to day care providers and other babysitters, and to make shaken baby syndrome a common, household concept. On everyone's refrigerator should be the simple phrase, coined by Dr. Jacy Showers: "Never, Never, Never Shake a Baby", as it should be posted in every preschool, elementary or grammar school, middle school or junior high and high school in the United States. Added to this should be positive recommendations for anyone who ever takes care of a child with simple steps to take when stressed by caretaking which will avoid harm to the child and provide relief for the caretaker.

Thank you, Dr. Jacy Showers, for your pioneering efforts in this field, for putting together the program for three wonderful national conferences on shaken baby syndrome, and for your continuing commitment to eradicate this preventable yet tragic form of child abuse. This

Executive Summary is dedicated to you as we continue to build on the solid foundations you've left for us.